Claims

1. Pressure control system with a pressure control device (1) for maintaining a constant predetermined excess pressure arranged in a fluid dispensing container (50; 60), said pressure control device comprises a first cylinder (15) having an open end and a closed end, and a piston (13) movable within said first cylinder defining a first chamber (16) filled with a gas exerting said predetermined excess pressure, a second chamber (7), a passageway from the second chamber (7) to the outside of the device leading to the container (50; 60), a valve (18, 23) for releasing and closing said passageway, wherein the second chamber (7) being filled with a gas at a pressure higher that said predetermined excess pressure, and said piston (13) having means for actuating said valve dependent from the pressure difference between the first chamber (16) and the container (50; 60), so that if the fluid pressure in the container drops below the predetermined excess pressure, gas flows from the second chamber (7) to the container until the container pressure approximately equals said predetermined pressure, characterized in that the second chamber is substantially a second cylinder (2) with a closed end (34) and an open end provided with a rim part (4), on which a closure (5) is mounted to close the second chamber, such that the second chamber is encompassing the first chamber, wherein the first chamber is part of the closure.

2. Pressure control system as claimed in claim 1, wherein the volume of the first chamber (16) is substantially smaller than the volume of the second chamber (7).

3. Pressure control system as claimed in claim 2, wherein the initial pressure of the gas in the second chamber (7) is defined by the formula:

$$P_2 \geq P_1 * (1 + V_1 / V_2)$$

wherein P_1 = the predetermined excess pressure

P_2 = the initial pressure in the second chamber

V_1 = the volume of the container
V_2 = the volume of the second chamber

4. Pressure control system as claimed in one of claims 1 to 3, wherein the closure (5) comprises a closing element (9A, 9B) commensurate to the rim part (4) of the second cylinder (2) and means (26) for mounting the first cylinder (15) of the first chamber in the closure (5).

5. Pressure control system as claimed in claim 4, wherein the upper end of the second cylinder (2) has a tapered neck portion (3).

6. Pressure control system as claimed in claim 5, wherein the closure (5) comprises a steplike funnel (6) directed inwardly to the neck portion (3).

7. Pressure control system as claimed in claim 4 or 5, wherein the closing element is an inner circular groove (10) of the closure (5) which is mounted to the rim part (4) of the second cylinder by means of vibration or ultrasonic welding.

8. Pressure control system as claimed in one of claims 1 to 7, wherein the second cylinder (2) has a central bottom opening (36) locked by a plug (37) for pressurizing the second chamber (7) with a gas.

9. Pressure control system as claimed in claim 1, wherein the second cylinder (2) is made of a plastic material by injection blow moulding.

10. Pressure control system as claimed in claim 9, wherein the second cylinder (2) is made of PET.

11. Pressure control system as claimed in one of claims 1 to 10, wherein the container (50; 60) is formed from a plastic material as a cylindrical bottle and the second cylinder (2) is welded to the inner wall of the container.

12. Pressure control system as claimed in claim 11, wherein the second cylinder (2) is laser welded to the inner wall of the container (50; 60).

13. Pressure control system as claimed in claim 11 or 12, wherein the container (50) has a dispensing opening with a dispensing valve (51), and a movable piston (52) is provided in the container between the pressure control device and the dispensing opening, which piston is separating the fluid and the gas, and which is movable towards the dispensing opening by the excess pressure prevailing in the container.

14. Pressure control system as claimed in claim 13, wherein the movable piston (52) is designed as a dome with annular sealing ribs (53, 54).

15. Pressure control system as claimed in claim 14, wherein the movable piston (52) is made of a resilient plastic material.

16. Pressure control system as claimed in claim 11 or 12, wherein the container (60) has a dispensing opening (61) with a dispensing valve (62), and a dip-tube (68) is provided from the entry of the dispensing valve (62) to the upper end of the pressure control device (1), in order to dispense the fluid through the dip-tube by the excess pressure prevailing in the container.

17. Pressure control system as claimed in claim 16, wherein the dispensing valve (62) has a spray nozzle (64).

18. Method for manufacturing a pressure control system as claimed in one of claims 1 to 17, wherein a container (50; 60) is formed; the bottom of the container is cut off; the first cylinder (15) is formed; the piston (13), the valve elements (18, 23) and the second cylinder (2) with the closed end and the closure (5) of the pressure control device (1) are formed out of a synthetic material of high stability; a central opening (36) is formed in the bottom of the second cylinder (2); the piston (13) is assembled with a sealing ring (14) in the first cylinder (15), whereas a gas is filled in the first chamber (16) at a predetermined pressure; the first cylinder (15) is mounted with respect to the valve (18, 23), such that the actuating means of the piston (13) is correctly positioned with respect to the valve; the closure (5) is mounted to the second

cylinder (2), and the second cylinder (2) and the container (50; 60) are joined in their respective bottom regions.

19. Manufacturing method as claimed in claim 18, wherein the container (50; 60) is formed from a synthetic material by injection stretch blow-moulding.

20. Manufacturing method as claimed in claim 18 or 19, wherein the second cylinder (2) is formed form a synthetic material by injection blow moulding.

21. Manufacturing method as claimed in claim 20, wherein the synthetic material is PET.

22. Manufacturing method as claimed in one of claims 18 to 21, wherein the closure (5) is mounted to the second cylinder (2) by vibration or ultrasonic welding.

23. Manufacturing method as claimed in one of claims 18 to 22, wherein the second cylinder (2) and the container (50; 60) are joined by laser welding.

24. Manufacturing method as claimed in claim 23, wherein the container (50; 60) is made of a transparent plastic material and the second cylinder (2) is made of a laser energy absorbing plastic material.

25. Manufacturing method as claimed in one of claims 18 to 24, wherein the second cylinder (2) is pressurized with an inert gas immediately after filling the container (50; 60) with a liquid.